IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Gilchrist et al.
Serial No : 09/424,811 Examiner : Hoffmann, J
Filed : November 30 1999 Art Unit : 1731
For : Method of Producing Water-Soluble Glass Fibres

DECLARATION

I, David Michael Healy, a British citizen of Midton House, By Alloway, KA7 4EZ, United Kingdom do hereby declare as follows:

1. I am employed by Giltech Limited, 9/12 North Harbour Estate, Ayr, Scotland KA8 8BN, United Kingdom. I am employed by Giltech Limited and am now Research and Development Manager in the Company. I hold a BSc in Physiology/Biochemistry/Microbiology and an MSc in Bioengineering.

2. I have been responsible for research and development of water soluble glass compositions, methods of forming glasses and applications of glass for fourteen years.

3. I am an inventor of US Application Serial No. 09/424,811, the Application in suit.

4. I have read and understood the Office Action dated September 13, 2001 issued for US Application Serial No 09/424,811. The Examiner considers that this Application lacks novelty over US Patent No 5,470,585.

5. At column 4, lines 42 to 45 US Patent No 5,470,585 it is stated that the composition of this invention "may be formed using conventional or centrifugal procedures ... or as fibres".

6. At the time of filing US Patent No 5,470,585 the only water soluble glass fibers formed by Giltech Limited were of relatively short length and/or were of brittle composition.

7. Fiber production for the water soluble glass compositions was problematic as the composition could not be drawn into fibers when hot as the compositions were too liquid, but the steep temperature viscosity gradient meant that the glasses very quickly became too viscous for fiber formation.

8. Prior to filing the Application in suit I made numerous attempts at drawing water-soluble glass forming compositions into fibers. I tried reducing the temperature of drawing to increase the viscosity of the glass. The glass crystallized very quickly (within a few minutes) when the composition was of a sufficient viscosity to pull. The fibers could not be pulled after crystallization.

9. Phosphorous pentoxide based water soluble glass forming compositions crystallize much more readily than non-water soluble glass forming compositions, such as silicon dioxide based glasses, due to the chemical composition of the glass at the temperatures concerned with fiber formation.

10. Based on my experience of glass production, I believe that the Examiner is mistaken in asserting that "a glass is a glass is a glass". Water soluble glass forming compositions having phosphorous pentoxide as the glass former exhibit different properties to non-water soluble glasses such as glass types E, A and C which use silicon dioxide as the glass former and do not contain phosphorous pentoxide.

11. The method of the present invention is the only method of making phosphorus pentoxide water soluble glass fibres

that I am aware of.

12. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardise the validity of the abovementioned Application or any Patent issued thereon.

Date : 12th February 2002 Signed : _____

David Michael Healy

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DECLARATION

I, Julian Ellis, a British citizen of 68 Carlton Road, Nottingham, NG3 2AP, United Kingdom do hereby declare as follows:

1. I hold a Master of Philosophy for research into the technology of fabrics. I am the Chairman of Ellis Developments Limited, a research and development company specialising in textile material science research. I have also worked as a Special Lecturer at the University of Nottingham since 1992. I advise a number of University Departments on matters relating to fibres. Since 1982 I have also worked as a self-employed technical consultant, providing specialist and technical advice on textile and fibre issues.

2. I have been actively employed in the textile industry for 30 years.

3. I am a fellow of the Textile Institute, and a Member of the Royal Society of Chemistry. I was accepted as a member of the British Academy of Experts, and have been listed and checked as an independent expert witness by the Law Society in the United Kingdom. I am Chairman of East Midlands Technical Textiles Forum, and was President of Nottingham Textile Society from 1996 to 1998. I was a member of the European Thematic Network on Medical Materials from 1998 to 2001.

4. I have read and understood US Patent No US 5,470,585 (Gilchrist).

5. In November 1995, the only water soluble glass fibres I was aware of had very low water solubility, and a dissolution rate of less than 0.01mg/cm^2/hour.

6. In November 1995 I was aware that water soluble fibres could not be formed using conventional glass forming methods.

7. If I had read US Patent No US 5,470,585 (Gilchrist) in November 1995 I would have considered the disclosure at column 4, lines 42 to 49 that the glass may be "formed by conventional or centrifugal procedures ... fiber or tube drawing" to be incorrect, although this has not been verified by me experimentally.

8. I was surprised to hear of the method of US Patent Serial No 09/424,811.

9. I consider the method of US Patent Serial No 09/424,811 to be novel and inventive over all documents I am aware of.

10. I believe that the method of US Patent Serial No 09/424,811 provides a technical breakthrough.

11. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the abovementioned Application or any Patent issued thereon.

Date : 7th Feb 2002 Signed : J. S. Ellis

Julian Ellis

MatWeb.com, The Online Materials Database

E-Glass Fiber, Generic

Subcategory: Ceramic; Glass; Glass Fiber

Key Words: GRP composites, fiber glass composites, single fiber, FRP composites

Component	Wt. %
Al2O3	15.2
BaO	8
CaO	17.2
MgO	4.7
NaO2	0.6
SiO2	54.3

Physical Properties	Metric	English	Comments
Density	2.54 - 2.6 g/cc	0.0918 - 0.0939 lb/in³	
Mechanical Properties			
Tensile Strength, Ultimate	3448 MPa	500000 psi	at 23°C (73°F); Virgin strength. 50-75% variation in finished product; 5310 MPa at -190°C (-310°F); 2620 MPa at 370°C (700°F); 1725 MPa at 540°C (1000°F)
Elongation @ break	4.8 %	4.8 %	
Modulus of Elasticity	72.4 - 72.5 GPa	10500 - 10500 ksi	at 23°C (73°F); 72.3 GPa at 540°C (1000°F)
Poisson's Ratio	0.2	0.2	
Shear Modulus	30 GPa	4350 ksi	Calculated.
Electrical Properties			
Electrical Resistivity	4.02E+12 ohm-cm	4.02E+12 ohm-cm	
Dielectric Constant	6.3 - 6.6	6.3 - 6.6	1MHz
Dielectric Strength	10.3 kV/mm	262 kV/in	
Dissipation Factor	0.0025	0.0025	1 MHz
Dissipation Factor	0.0034	0.0034	60 Hz
Thermal Properties			
CTE, linear 20°C	5 µm/m-°C	2.78 µin/in-°F	
CTE, linear 250°C	5.4 µm/m-°C	3 µin/in-°F	from -30 to 250°C (-20 to 480°F)
Heat Capacity	0.81 J/g-°C	0.194 BTU/lb-°F	at 23°C (73°F); 1.03 J/g-°C (0.247 Btu/lbf-°F) at 200°C (390°F)
Thermal Conductivity	1.3 W/m-K	9.02 BTU-in/hr-ft²-°F	
Melting Point	Max 1725 °C	Max 3140 °F	
Optical Properties			

Refractive Index	1.558	1.558	
Refractive Index	1.562	1.562	bulk annealed

References are available for this material.
